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SPEC

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imparts The tooth-shaped portion is the one which and is molded. The re-
                                                                                                   Portion 7.
                                                                                            imparts the final shape of the ceramic core when the investment material 2 and is made of a
                                                                                         is for holding the jut therein and is molded. The cast iron or a stainless steel. and the backing member 3
                                                                                     cast iron or a stainless steel, and the backing member 3
                                                                                   cast iron or a stainless steel, and the backing member of heating and is a cloth-like
                                                                                 works to compensate for the expansion of the investing and is a cloth-like
                                                                               c_{e_{r_{am_{i_c}}}} m_{a_{t_{e_{r_{i_ai}}}}}.
                                                                                         Amic material.

In the mold I, a solid lubricant film 8 is formed on the surface of
                                                                       the surface of the sprue portion 6 and on the surface of the tooth-shaped portion 7.
                                                                     the surface of the sprue

The investment the sprue

The investment material portion 6 and on the surface

The investment material portion 6 and on the surface

The investment material portion 6 and on the surface

The investment material portion 6 and on the surface formed on at least the
                                                                  The investment material of the solid lubricant film 8 the tooth-shaped on at least the tooth-shaped on the investment material of the tooth-shaped on at least the
                                                               The solid lubricant surface of the investment may be formed on at least to the formed on the formed on the formed on the formed on the
                                                            surface of the portion 7 and investment material of the investment material of the investment material of the tooth-shape investment material of the formed on the annual of the annual 
                                                          surface of the not necessarily be formed on the only of the sprue portion of the sprue portion of the desired
                                                      For obtaining investment material of the sprue portion of the surface of the solid lubricant film is formed on the surface of the surface of
                                                    For obtaining that the solid an enhanced effect, however, is solid investment material of the sorne bortion. too.
                                                  that the solid lubricant film is formed on the sur fahricating the approximation, too.
                                           described with method of fabricating the mold l will be formed on a gypsum
                                         described with reference to Fig. J.

Model of a tooth on which a ceramic Crown which is an gypsum
                                      Model of a tooth on which a ceramic crown of the monunted (the shape which is an of the wax
                                   object at tooth on which a ceramic crown which is an or the shape of the wax
                                object

Pattern g ticle will be mounted (the shape of the tooth-shaped of wax.
                             Pattern g Corresponds to the shape of the tooth-shaped of the sprue line 10 corresponds to the shape of the sprue line 10 corresponds to the tooth the shaped
                           portion 7).

and the shape of the sprue line 10 (usually made of we shape of the sprue line 10 corresponds to the wax nattern
                        and the shape of the sprue line 10 corresponds to the member 112 (the shape of the shape of the shape of the sprue line 10 corresponds to the shape of the
                     and is installed on a pole is stud on the member corresponds to the shape of the ceramic
                  and is installed on a pole member 112 (the shape of the ceramic former 1
               Pole member corresponds to the shape of the ceramic the crucible former 11 is the chair of the crucible former 11.
             The crucible former 11 is the one in which the pole member
          The crucible former 11 is the one in which the pole member surface thereof. is formed at the
      portion in the upper surface thereof, is formed at the central with horton. The central with horton. The central with horton.
    central portion in the upper surface thereof, is formed at the wax battern g is fitted to the
central portion of a cylinder III with bottom. The wax pattern g is fitted to the
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receased fitting portion of easy handling and easy secured. secured. From the standpoint of easy handling and easy is the standpoint of easy handling former 11 is tanered at 0.005 moldability, it is pole member 112 is tanered at moldability, which the pole member 122 is tanered at the moldability, which the pole member 122 is tanered at 0.005 moldability. moldability, it is desired that the crucible former 0.005

moldability, it is desired member 112 is tapered at and the one in which the Pole member that expands downward and the one to possess a diameter that expands downward the old to possess a diameter that expands downward and the one in which to possess a diameter that expands downward and the old to possess a diameter that expands downward and the old the pole of the old the the one in which the Pole member that expands downward and, to possess a diameter to 0.120 to possess and to 0.120 to possess and to o.120 to possess one made of a synthetic runher for easy to particularly. to 0.120 to possess a diameter that expands downward and, that expands downward to easy in the one made of a synthetic rubber for in the present inventors in the present inventors in particularly, particularly, as proposed already by particularly, the one made of a synthetic rubber for easy the present inventors if two present are proposed already by the present Here. If the present as proposed already ho. 13916/1999. removal as proposed already by the present inventors in two years as proposed already by 13916/1999. Rere, denoted lapanese Patent Application No. 112 have heights denoted Japanese Patent the Dole member 112 have heights of the Dole member and heights of the Dole member 112 have heights denoted given heights of the Dole member 112 have heights denoted given heights of the Dole member 112 have heights denoted given Japanese Patent Application No. 73916/1999 heights denoted the pole member 112 have heights the root of the unner surface of the local from t given points of the pole member 112 have heights denoted of the bottom the upper surface of that heights had diameters at that heights by h1 and h2 (heights former 11) and diameters at that heights of the crucible former by hi and hi (neights from the upper surface of the bottom and diameters at that heights for a stands for a stands for a the crucible former 11) then. the taper stands for a are denoted by all and all and all are denoted by all are deno of the crucible former 11) and diameters at that heights the taper stands for a then to formula, and following formula, are denoted by the following formula. After the wax pattern and in annied out the aurtana are denoted by al and allowing formula, After the wax pattern 9 is secured as described of applied onto the surface of applied onto the surface of above, a solid lubricant as required, onto the surface of the wax pattern 9 and, as required. above, a solid lubricant is applied onto the surface of the solid lubricant is applied onto the surface of the solid lubricant is the wax pattern 9 and, as the solid lubricant is the wax pattern 10. the sprue line 10. Then, the solid lubricant is material the sprue line 10. Then, the surface of the investment and in whereho, a solid lubricant is material the sprue line 10. Then, is hurned and whereho, a solid lubricant is material when the wax pattern is hurned and when the wax pattern is h the wax pattern 9 and, as required, onto the surface of the investment matter the sprue line the surface of the investment the sprue line the surface of the investment the sprue line the surface of the investment of the surface of transferred onto the surface of the investment material when the wax pattern is burned and making it house when the wax pattern formed in the mold. making it house when the wax pattern is formed in the mold. when the wax pattern is burned and, whereby, a solid it possible is burned and, whereby, it possible material is the mold, making in the material is the mold in the ceramic material is lubricant film is formed time when the ceramic material is lubricant the molding time when the ceramic material is lubricant the molding time when the ceramic material is lubricant the molding time when the ceramic material is lubricant. lubricant film is formed in the mold, making it possible to shorten the molding time when the ceramic material is to shorten the mold. into the mold. however, a the method of however, a the mold. however, a the mold. however, a the mold. however, a the mold. however, a however, a the mold. however, a however, a the mold. however, a however, a lying the mold. applying the solid lubricant, lubricant powder, also simply also containing a binder (nereinafter also simply suspension containing a binder solvent and an organic solvent and an organic solvent and an organic solvent solven There is no particular limitation on the method of preferably, nowever, an order the solid lubricant lubricant powder, an applying containing a solid lubricant powder. 15 suspension containing a solid lubricant powder, an organized lubricant powder, an organized lubricant powder, an organized lubricant powder, an organized lubricant line and the surface lubricant is annihed to the surface solvent and an organized lubricant powder, and organized lubricant powder, and organized lubricant powder, and organized lubricant powder, and organized lubricant solvent and an organic binder (hereinafter also simply the surface of referred to as coating and, as required, to the surface of the wax pattern 9 and, as required. referred to as coating solution) is applied to the surface of the wax pattern and is dried.

of the wax line 10, and is dried. put into the mold. aprue line in a a commonent of the coating equit. There is no particular limitation on the solid coating solution of the coating solution are union is a component of the librication are union is a solid that exhibits a librical it is a solid that exhibits a provided it is a solid that exhibits a solid that exhibits a librical it is a solid Tubricant which is a component of the coating solution action.

Indicate which is a solid that exhibits a lubricant that can be provided it is a solid the solid lubricant that can be concrete examples of the solid lubricant. the aprile in an north and is dried. provided it is a solid that exhibits a lubricating be to the solid lubricant include the concrete examples of the present invention include the preferably used in the present. Concrete examples of the present invention include tungsten preferably used in the present invention include tungsten preferably used in the present invention include tungsten in the present invention in the present invention in the present in index of the glass material by 0.01 to 10 µm, in order average particle diameter of from 0.1 index of the glass material by 0.01 to 10 µm, in order baking and the dearest of from 0.1 to 10 µm, in order the dearest of transparency after baking average particle the dearest of transparency after the dearest of transparency after baking average particle the dearest of transparency after baking average particle the dearest of transparency after the dearest of transparency after baking average particle the dearest of transparency after baking and the dearest of transparency and transparen average particle diameter of from 0.1 to 10 km, in order transparency after baking average particle the degree of transparency will not appear to suitably lower of the underlying core will not to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitably color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the underlying core will not appear to suitable the color of the color of the underlying core will not appear to suitable the color of the c to suitably lower the degree of transparency after baking core will not appear of the underlying core tone close to be that the color to obtain a color tone close to conspicuously. Bo that the color of the underlying core will not appear to obtain a color tone close to obtain a color tone of the underlying core tone close to obtain a color tone affect of the color of the above mentioned affect tooth.

Conspicuously, tooth. conspicuously, thereby to obtain a color tone close to is me above mentioned to the nia conspicuously, thereby to me above mentioned to the inordanic howder added to the inordanic howder added to the that of a natural the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the that obtained when the inordanic howder added to the inordanic that of a natural tooth. The above mentioned effect is above mentioned to the glass or when the inorganic powder added or when the not obtained when not crystalline but is amorphous, or when the not obtained when not crystalline but is amorphous. not obtained when the inorganic powder added to the glass material has at material is not crystalline added to the glass material has an aterial is not crystalline added to the glass material has a material is not crystalline added to the glass material has a material is not crystalline added to the glass material has a material is not crystalline added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a material in powder to be added to the glass material has a materia material is not crystalline but is amorphous, or when the diameter to be added to the particle diameter inorganic powder to the refractive index, particle diameter inorganic any one of the refractive index. inorganic powder to be added to the glass material has at inorganic powder to be added to index, particle diameter index, the above the refractive outside the above least any one of that lies outside the above or amount of addition that lies outside the above the refractive outside the above amount of addition that lies outside the above or amount of addition that lies outside the above the refractive outside the above of addition that lies outside the above of amount of addition that lies outside the refractive outside the above of the refractive outside the refractiv least any one of the refractive index, particle diar promition of the refractive outside the growth of addition that lies orvetalline or amount of addition it is orvetalline or amount ranges though it is orvetallined ranges. or amount of addition that lies crystalline. That the above the amount of addition that is crystalline. That the amount of the effect. It is more desired that mentioned ranges the effect. mentioned ranges though it is crystalline. From 1.04 is more desired that 0.04 is from 0.04 at and point of the diffractive index is from 0.04 difference (A) in the diffractive index is from 0.04 difference standpoint of the effect, it is more desired that the to index is from 0.04 to index difference (A) in the diffractive index is from 0.04 to 5 µm and the oil from 0.1 to 5 µm and how the diffractive index is from 0.1 to 5 µm and how the oil from 0.1 to 5 µm and how the oil from 0.1 to 5 µm and how the oil from 0.1 to 5 µm and the oil from 0.1 to 5 µm and the oil from 0.1 to 6 addition (narts by weight of addition of additio 0.1, the particle diameter is from 0.1 to 10 parts by weight per 0.1 to 10 parts amount of addition (Parts la) is from 0.1 to 10 parts weight of the glass material) amount of addition (parts by weight per 100 parts by weight of the glass material) is from 0.1 to 10 parts by weight the inorganic on the inorganic material modern material the inorganic material mater There is no particular limitation on the inorganic of the dental pottery material the dental pottery index is crystalline powder invention provided its refractive invention provided the present present invention provided the present pr crystalline powder used for the dental pottery material index is refractive index material its refractive index of the glass material invention provided index of the glass material index is a second contractive index of the glass material index is a second contractive index is a second contractive index is a second contractive index index is a second contractive index index is a second contractive index i the Present invention provided its refractive index stands

the Present from the refractive the refractive index different from 0.01 to 0.1.

Here. different from the refractive index of the glass material index stands the refractive index at and the measured by from 0.01 to 0.1. Here, and can be measured by from 0.01 the powder at 23°C, and can be measured by from of the powder at 23°C, and can be measured by from the powder at 23°C. by from 0.01 to 0.1. Here; the refractive index stands a refractive and can be measured by for that of the powder at method) in which a refractive for that (liquid immersion method) in which a refractive for that of the powder at 23°C, and can be measured by a refractive in which a refractive at that of the powder at 23°C, and can be measured by a refractive a refractive and in which a redetermined in the result of the powder at 23°C, and can be measured by a refractive and can be method (liquid immersion method) in which a refractive index index of a liquid organic medium having a predactive index index of a liquid is recarded to be the refractive index refractive index index is recarded to be the refractive index index is recarded to be the refractive index index is refractive index index is refractive index of a liquid organic medium having a predetermined index to be the refractive the immersion the refractive index is regarded to be the immersion the refractive index heromes transparent by immersion the refractive index the refractive index heromes transparent by immersion the refractive index the refractive index ind weight. refractive index is regarded to be the refractive the all refractive index of the all Transparent by index of the above index of the above Powder in the liquid. The refractive index of the above in the liquid. The measured by using the Abbe, the qlass material has a liquid organic medium can be measured. The qlass material has a refractometer. liquid organic medium can be measured by using the Abt the glass material has a the glass material organic medium can be measured by using the Abt has a liquid organic medium can be measured by the Abt has a liquid o refractioneter. In general the glass material has to 1.55.

The glass material has to 1.55.

The from 1.45 to 1.55.

In general the glass material has to 1.55.

The from 1.45 to 1.55.

The from 1.45 to 1.55.

The from the inormanic crystalline not the inormal cr refractive index of the index of 1.54 which is a preferred examples (refractive index of 1.54) which is preferred examples (refractive index of 1.54) which is a preferred examples (refractive index of 1.54) which is a preferred examples (refractive index of 1.54) which is a preferred examples (refractive index of 1.54) which is a preferred examples (refractive index of 1.54) which is a preferred examples (refractive index of 1.54) which is a preferred examples (refractive index of 1.54). Preferred examples of the inorganic crystalline powder is a preferred examples of the inorganic of 1.54) which is a preferred examples of the index index a cristobalite (refractive index a cristobalite (refractive index) of ailicon dioxide. A cristobalite (refractive index) of ailicon dioxide. Will be a quartz (refractive index of 1.54) which is a cristobalite (refractive a cristobalite (refractive a cristobalite) powder in the Liquid.

The applied coating solution was dried aing left to stand in the open air.

The investment material mud (trade name: ok into the int Then, a investment material mud (trade into the inner powder, manufactured by GC Co.) was poured ribbon (backing fowder, menufactured ring and the crystal ribbon side of the casting ring and the crystal ribbon side of the casting ring and the crystal ribbon the casting ring and the crystal ribbon (backing fowder) and the casting ring and the crystal ribbon (backing fowder) and the casting ring and the crystal ribbon (backing fowder) are crystal ribbon (backing fowder). Powder, manufactured by GC CO. was poured into the inner ring and the crystal ribbon (backing and the crystal to the crucible side of the that the wax pattern secured to the member) so that the wax pattern secured to the crucible drying was 10 km. stand in the open air.

by being left in the open air. Bide Of the casting ring and the crystal ribbon (backing ring and the crystal ribbon crucible secured to the crucible number) so that the wax pattern after the investment.

After the investment therein. former was invested therein. After the investment was removed, atter the investment was removed, attern the wax nattern the crucible former the wax nattern at 800°C to burn the wax nattern naterial was heating at 800°C to burn the wax nattern followed by heating at 800°C. material was cured, the crucible former was removed, and she crucible former was pattern and the wax pattern and the wax pattern at 800°C to burn the wax pattern and the mold. drying was 20 µm. followed by heating at 800°C to burn the wax pattern the mold.

followed by heating at 800°C thereby to prepare the mold.

the sprue line at 800°C thereby to prepare the mold. memoer was invested therein. nple 1)

A coating solution was prepared from an average naving an average naving an average nation of a horon nitride nawder having an average nation of a horon nitride nawder having an average nation of a horon nitride nawder having an average nation of a horon nitride named and a second national nations of a horon nitride nations of a horon nitride named and national nations of the national national nations of the national na weight of a boron nitride powder having an average ethyl ketons

weight of a boron of 2 µm, weight of a methyl ethyl ketons

particle diameter of parts by weight of a methyl ethyl ethyl ketons A coating solution was prepared from 4 parts by A parts by weight of a poron nitride powder having an average weight of a diameter of 2 mm. 2 parts by weight of a particle diameter of 2 mm. Particle diameter of 2 µm, 2 parts by weight of an ethyl ketone.

Particle diameter of 2 µm, 2 parts by weight of a methyl ethyl the above coating the and 94 parts by using the above coating cellulose the mold prepared by using the mold Cellulose and 94 parts by weight of a methyl ethyl keto the above coating the above conducted by using the mold prepared by using molding was conducted by using the heated/pressurized molding the heated/pressurized mo By using the mold prepared by using the above conducted in the heated/pressurized molding was conducted in solution, as described below. mer as described below. first, put into a ring furnace the mold was, rated up to rhat is, wal, manufactured by kor co., heated up to a ring furnace as described below. That is, the mold was, first, put into a ring furnace was, first, put into a ring furnace, heated up to co.), heated up to name: was, manufactured by kor co.), heated up to co. (Example 1) Itrade name: VR1, manufactured by KDF Co.), heated up to 15 minutes, to 15 minute 800°C at a rate of 50°C a minute over about 45 minutes to this temperature the cylindrical After pre-heated. The cylindrical and was maintained at After pre-heated. and was maintained at this temperature the cylindrical to the algorithm and were fitted to the pre-heated, were fitted to the pre-heat and the starting grant to the starting pre-heat and the starting plunger and the starting plunger and the starting pre-heat and the starting pre-heat and the starting pre-heat and the starting plunger and the st a manner as described below. Pre-heat the mold. After pre-heated, the cylindrical to the ingot were fitted to the plunger and the starting of the mold. which was then plunger and the nortion of the mold. ceramic-holding portion of the mold, which was then has been that has been of the mold, which was that has been furnace that has been at a point and the mold, which was then has been mold, which was that has been mold, which was that has been mold, which was that has been of the mold, which was that has been of the mold, which was that has been mold, which was that has been mold, which was that has been of the mold, which was that has been mold, which was that has a point of the mold, which was that has a point of the mold, which was that has been mold, which was that has a point of the mold, which was that has a point of the mold, which was that has a point of the mold, which was that has a point of the mold, which was that has a point of the mold, which was the mold, which Plunger and the starting glass ingot were fitted to to the starting glass ingot which was then had not the mold, which was then had not the mold, which was then had provided furnace that he ceramic holding portion a heated/oressurized furnace that introduced into a heated/oressurized furnace introduced into a heated/oressurized furnace introduced into a heated/oressurized furnace that he ceramic holding portions are not held t introduced into a heated/pressurized furnace that has to the starting a heated/pressurized furnace the starting that starting the starting starting that starting the starting starting that starting the starting sta heated in advance at 900°C. Thereafter, the starting at 900°C. Thereafter, the starting at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was a pressing the glass ingot was maintained at 900°C which was material the glass ingot was a pressing the glass ingot was a pr glass ingot was maintained at 900°C which was a presurized at the glass material and the glass material and the glass material temperature for 10 minutes, degree was pressurized at temperature a sufficient degree was pressurized at temperature a sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressurized at the glass material temperature as sufficient degree was pressured to a sufficient degree was pres temperature for 10 minutes, and the glass material this and the glass material at the glass material at this and the glass material at the glass material softened to a sufficient degree was pressurized at this softened to a sufficient degree was pressurized at the complex temperature with a pressing load of 7.2 After complex temperature with he nut into the mold. temperature with a pressing load of 7.2 kg/cm<sup>2</sup> via a After completely into the mold. After complete at the put into the glass material was maintained at plunger so as to be put the glass material was maintained put into the mold. Plunger so as to be put into the mold. Was maintained at the glass material then. cooled.

Plunger the mold, the glass material then. cooled.

Put into the mold, 10 minutes and was, then. 900°C for another 10 minutes and was article was taken out; molded article was taken out; molded and the molded article was taken out; put into the mold, the glass material was maintained; then, cooled. then, cooled. then, cooled article was take and the molded article was take good to the molded and the molded article was take good to the molded article was take good t